What is claimed is:

1. An electric-field meter for measuring at least one of a magnitude and polarity of an electric field, comprising:

a housing at least partially constructed of a conductive material, the housing defining a retaining space;

an electrode assembly on the housing and selectively exposed to the electric field;

a shield assembly for alternately covering and exposing the electrode assembly to the electric field;

a movement assembly having a source of motive force and a linkage operably connected to one of the shield assembly and the electrode assembly for alternately covering and exposing the electrode assembly to the electric field;

a position detection assembly for monitoring the position of at least one of the shield assembly and the electrode assembly and providing a position detection signal indicative of the position of one of the shield assembly and the electrode assembly;

a charge measurement circuit having an input receiving charge on the electrode assembly, the charge measurement circuit providing a charge detection signal indicative of the charge induced on the electrode

assembly as the electrode assembly is selectively exposed to the electric field;

means for determining an average leakage current at the input of the charge measurement circuit; and

means for generating a compensation current generally equal to and opposite in polarity to the determined average leakage current at the input of the charge measurement circuit, wherein the compensation current is supplied to the input of the charge measurement circuit.

2. The electric-field meter of claim 1, further comprising means for determining a zero-signal offset error.

3. The electric-field meter of claim 1, further comprising means for correcting for the average leakage current at the input of the charge measurement circuit.

4. The electric-field meter of claim 3, further comprising means for determining and correcting for a zero-signal offset error.

5. The electric-field meter of claim 1, wherein the means for generating a compensation current comprises:

a compensation voltage source generating a programmable compensation output; and

a resistance in which the compensation current is developed.

6. The electric-field meter of claim 5, wherein the compensation voltage source is a digital-to-analog converter controlled by the means for determining an average leakage current at the input of the charge measurement circuit.

7. The electric-field meter of claim 1, further comprising means for mechanically adjusting an effective aperture to vary the exposure of the electrode assembly to the electric field.

8. The electric-field meter of claim 1, further comprising a flexible conductor bonded to the linkage of the movement assembly for maintaining electrical contact between the movement assembly and at least one of the ground reference potential and the charge measurement circuit.

9. The electric-field meter of claim 1, wherein the position detection assembly comprises:

a first element mounted to one of the shield assembly and the electrode assembly;

a second element mounted in a known relationship to the predetermined path of the first element such that upon sweeping the first element near the

second element, the second element interacting with the first element when the first element passes near the second element, at least one of the first and second elements providing signals indicative of the position of at least one of the shield assembly and the electrode assembly; and

a detect circuit receiving signals from one of the first element and the second element, the detect circuit output being indicative of the position of at least one of the shield assembly and the electrode assembly.

10. An electric-field meter for measuring at least one of a magnitude and polarity of an electric field, comprising:

a housing at least partially constructed of a conductive material, the housing defining a retaining space;

an electrode assembly on the housing and selectively exposed to the electric field;

a shield assembly for alternately covering and exposing the electrode assembly to the electric field;

a movement assembly having a source of motive force and a linkage operably connected to one of the shield assembly and the electrode assembly for alternately covering and exposing the electrode assembly to the electric field, the movement assembly being stationary and exposing at least a portion of the electrode assembly for a predetermined time

period whereby the electric-field meter functions as an electric-field-change meter during the predetermined time period;

a charge measurement circuit having an input receiving charge on the electrode assembly, the charge measurement circuit providing a charge detection signal indicative of the charge induced on the electrode assembly as the electrode assembly is selectively exposed to the electric field;

means for determining an average leakage current at the input of the charge measurement circuit; and

means for generating a compensation current generally equal to and opposite in polarity to the determined average leakage current at the input of the charge measurement circuit, wherein the compensation current is supplied to the input of the charge measurement circuit.

11. The electric-field meter of claim 1, further comprising means for determining a zero-signal offset error.

12. The electric-field meter of claim 10, further comprising means for correcting for the average leakage current at the input of the charge measurement circuit.

13. The electric-field meter of claim 12, further comprising means for determining and correcting for a zero-signal offset error.

14. The electric-field meter of claim 10, wherein means for generating a compensation current comprises:

a compensation voltage source generating a programmable compensation output; and

a resistance in which the compensation current is developed.

15. The electric-field meter of claim 14, wherein the compensation voltage source is a digital-to-analog converter controlled by the means for determining an average leakage current at the input of the charge measurement circuit.

16. The electric-field meter of claim 10, further comprising means for mechanically adjusting an effective aperture to vary the exposure of the electrode assembly to the electric field.

17. The electric-field meter of claim 10, further comprising a flexible conductor bonded to the linkage of the movement assembly for maintaining electrical contact between the movement assembly and at least one of the ground reference potential and the charge measurement circuit.

18. The electric-field meter of claim 10, wherein the position detection assembly comprises:

a first element mounted to one of the shield assembly and the electrode assembly;

a second element mounted in a known relationship to the predetermined path of the first element such that upon sweeping the first element near the second element, the second element interacting with the first element when the first element passes near the second element, at least one of the first and second elements providing signals indicative of the position of at least one of the shield assembly and the electrode assembly; and

a detect circuit receiving signals from one of the first element and the second element, the detect circuit output being indicative of the position of at least one of the shield assembly and the electrode assembly.

19. A method for generating a compensation current for a charge measurement circuit, comprising the steps of:

a. determining an average leakage current at the input of the charge measurement circuit; and

b. generating a compensation current generally equal to and opposite in polarity to the determined average leakage current at the input of the charge measurement circuit, wherein the compensation current is supplied to the input of the charge measurement circuit.

20. The method of claim 19, further comprising the step of repeating steps a and b to compensate for the leakage current at the input of the charge measurement circuit in real-time.

21. An electric-field meter for measuring at least one of a magnitude and polarity of an electric field, comprising:

a housing at least partially constructed of a conductive material, the housing defining a retaining space;

an electrode assembly on the housing and selectively exposed to the electric field;

a shield assembly for alternately covering and exposing the electrode assembly to the electric field;

a movement assembly having a source of motive force and a linkage operably connected to one of the shield assembly and the electrode assembly for alternately covering and exposing the electrode assembly to the electric field;

a position detection assembly for monitoring the position of at least one of the shield assembly and the electrode assembly and providing a position detection signal indicative of the position of one of the shield assembly and the electrode assembly;

a charge measurement circuit having an input receiving charge on the electrode assembly, the charge measurement circuit providing a charge detection signal indicative of the charge induced on the electrode assembly as the electrode assembly is selectively exposed to the electric field; and

means for automatically and continuously determining an average leakage current at the input of the charge measurement circuit.

22. The electric-field meter of claim 21, further comprising means for automatically and continuously determining a zero-signal offset error.

23. The electric-field meter of claim 21, further comprising means for automatically and continuously correcting for the average leakage current at the input of the charge measurement circuit.

24. The electric-field meter of claim 23, further comprising means for automatically and continuously determining and correcting for a zero-signal offset error.

25. The electric-field meter of claim 21, further comprising means for mechanically adjusting an effective aperture to vary the exposure of the electrode assembly to the electric field.

26. An electric-field meter for measuring at least one of a magnitude and polarity of an electric field, comprising:

a housing at least partially constructed of a conductive material, the housing defining a retaining space;

an electrode assembly on the housing and selectively exposed to the electric field;

a shield assembly for alternately covering and exposing the electrode assembly to the electric field;

a movement assembly having a source of motive force and a linkage operably connected to one of the shield assembly and the electrode assembly for alternately covering and exposing the electrode assembly to the electric field;

a position detection assembly for monitoring the position of at least one of the shield assembly and the electrode assembly and providing a position detection signal indicative of the position of one of the shield assembly and the electrode assembly;

a charge measurement circuit receiving charge on the electrode assembly, the charge measurement circuit providing a charge detection signal indicative of the charge induced on the electrode assembly as the electrode assembly is selectively exposed to the electric field; and

means for automatically and continuously determining a zero-signal offset error.

27. The electric-field meter of claim 26, further comprising means for automatically and continuously correcting for the zero-signal offset error.

28. The electric-field meter of claim 26, further comprising means for mechanically adjusting an effective aperture to vary the exposure of the electrode assembly to the electric field.

29. The electric-field meter of claim 27, further comprising means for mechanically adjusting an effective aperture to vary the exposure of the electrode assembly to the electric field.